

AMENDMENTS TO THE CLAIMS

Please cancel Claims 18 through 59 without prejudice to or disclaimer of the subject matter recited therein.

Please amend Claims 1, 2, 4, 60 through 66, 69, and 70 to read as follows.

Note that all the claims currently pending in this application, including those not presently being amended, have been reproduced below for the Examiner's convenience.

1. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

(a) $35 < v11n < 65$, and

(b) when $35 < v11n \leq 52$ [≤ 52]],

$$-0.013 v11n + 2.19 < N11n < -0.005 v11n + 1.92,$$

when $52 < v11n \leq 60$ [≤ 60]],

$$1.5 < N11n < -0.005 v11n + 1.92,$$

when $60 < v11n < 65$,

$$1.5 < N11n < -0.022 v11n + 2.94,$$

where $v11n$ is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and $N11n$ is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said first lens unit has a second negative lens other than said negative lens located on the most object side thereof, and said second negative lens satisfies the following conditions:

- (c) $35 < v_{12n} < 65$, and
- (d) when $35 < v_{12n} \leq 52$ [≤ 52],
 $-0.013 v_{12n} + 2.19 < N_{12n} < -0.005 v_{12n} + 1.92$,
when $52 < v_{12n} \leq 60$ [≤ 60],
 $1.5 < N_{12n} < -0.005 v_{12n} + 1.92$,
when $60 < v_{12n} < 65$,
 $1.5 < N_{12n} < -0.022 v_{12n} + 2.94$,

where v_{12n} is an Abbe number of a material of said second negative lens of said first lens unit, and N_{12n} is a refractive index of the material of said second negative lens of said first lens unit, and

wherein the separation between adjacent lens units varies during zooming, and
wherein no lens is present between (a) said negative lens located on the most object side of said first lens unit and (b) said second negative lens.

2. (Currently Amended) A zoom lens according to claim 63, wherein said first lens unit has a second negative lens other than said negative lens located on the most object side thereof, and said second negative lens satisfies the following conditions:

- (c) $35 < v_{12n} < 65$, and
- (d) when $35 < v_{12n} \leq 52$ [≤ 52],
 $-0.013 v_{12n} + 2.19 < N_{12n} < -0.005 v_{12n} + 1.92$,

when $52 < v_{12n} \leq 60$ [≤ 60]],

$1.5 < N_{12n} < -0.005 v_{12n} + 1.92$,

when $60 < v_{12n} < 65$,

$1.5 < N_{12n} < -0.022 v_{12n} + 2.94$,

where v_{12n} is an Abbe number of a material of said second negative lens of said first lens unit,
and N_{12n} is a refractive index of the material of said second negative lens of said first lens unit.

3. (Original) A zoom lens according to claim 1, wherein said zoom lens becomes, at a telephoto end, a telephoto type in which a plurality of lens units are divided into a lens group on the object side composed of at least one lens unit having a positive refractive power and a lens group on the image side composed of at least one lens unit having a negative refractive power.

4. (Currently Amended) A zoom lens ~~according to claim 1~~, comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

(a) $35 < v_{11n} < 65$, and

(b) when $35 < v_{11n} < 52$,

$-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92$,

when $52 < v_{11n} < 60$,

$$\underline{1.5 < N11n < -0.005 v11n + 1.92,}$$

$$\underline{\text{when } 60 < v11n < 65,}$$

$$\underline{1.5 < N11n < -0.022 v11n + 2.94,}$$

where v11n is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N11n is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said first lens unit has a second negative lens other than said negative lens located on the most object side thereof, and said second negative lens satisfies the following conditions:

$$(c) \quad \underline{35 < v12n < 65, \text{ and}}$$

$$(d) \quad \underline{\text{when } 35 < v12n < 52,}$$

$$\underline{-0.013 v12n + 2.19 < N12n < -0.005 v12n + 1.92,}$$

$$\underline{\text{when } 52 < v12n < 60,}$$

$$\underline{1.5 < N12n < -0.005 v12n + 1.92,}$$

$$\underline{\text{when } 60 < v12n < 65,}$$

$$\underline{1.5 < N12n < -0.022 v12n + 2.94,}$$

where v12n is an Abbe number of a material of said second negative lens of said first lens unit, and N12n is a refractive index of the material of said second negative lens of said first lens unit,

wherein the separation between adjacent lens units varies during zooming, and

wherein, during variation of magnification from a wide-angle end to a telephoto end, said first lens unit moves with a locus convex toward the image side, said second lens unit moves toward the object side in such a way as to decrease a separation between said first lens unit and said second lens unit, said third lens unit moves toward the object side in such

a way as to increase a separation between said second lens unit and said third lens unit, and said fourth lens unit moves toward the object side in such a way as to decrease a separation between said third lens unit and said fourth lens unit.

5. (Original) A zoom lens according to claim 1, wherein said zoom lens satisfies the following condition:

$$0.9 < |f_1/f_w| < 1.8$$

where f_1 is a focal length of said first lens unit, and f_w is a focal length of said zoom lens in a wide-angle end.

6. (Original) A zoom lens according to claim 1, wherein said first lens unit comprises, in order from the object side to the image side, a negative lens of meniscus form having a convex surface facing the object side, a negative lens, and a positive lens of meniscus form having a convex surface facing the object side.

7. (Original) A zoom lens according to claim 1, wherein said second lens unit and said fourth lens unit move in unison with each other during variation of magnification.

8. (Original) A zoom lens according to claim 1, wherein said zoom lens satisfies the following conditions:

$$0.65 < f_2/f_w < 1.3$$

$$1.2 < |f_3/f_w| < 3.4$$

where f_2 and f_3 are focal lengths of said second lens unit and said third lens unit, respectively, and f_w is a focal length of said zoom lens in a wide-angle end.

9. (Original) A zoom lens according to claim 1, wherein said zoom lens consists of said first to fourth lens units, and satisfies the following condition:

$$2.1 < f_4/f_w < 8.5$$

where f_4 is a focal length of said fourth lens unit, and f_w is a focal length of said zoom lens in a wide-angle end.

10. (Original) A zoom lens according to claim 1, wherein said second lens unit comprises two positive lenses and one negative lens.

11. (Original) A zoom lens according to claim 1, wherein said third lens unit comprises a cemented lens composed of a negative lens and a positive lens.

12. (Original) A zoom lens according to claim 1, wherein said fourth lens unit comprises a negative lens and a positive lens, and has at least one aspheric surface.

13. (Original) A zoom lens according to claim 1, wherein said second lens unit comprises one positive lens and a positive cemented lens composed of a negative lens and a positive lens.

14. (Original) A zoom lens according to claim 1, wherein said fourth lens unit has a plastic aspheric lens.

15. (Original) A zoom lens according to claim 1, wherein said second lens unit comprises one positive lens and a positive cemented lens composed of a negative lens and a positive lens, said third lens unit comprises a negative lens and a positive lens, and said fourth lens unit comprises a negative lens and a positive lens, and has a plastic aspheric lens.

16. (Original) An image pickup apparatus comprising a zoom lens according to claim 1, a photosensitive member, and means for supporting said zoom lens and said photosensitive member.

17. (Original) An image projection apparatus comprising a zoom lens according to claim 1, a light source, and an image forming element, and arranged to project an image.

18-59. (Cancelled)

60. (Withdrawn – Currently Amended) A zoom lens according to claim 1 or 18, wherein the following conditions are satisfied:

$$1.1 < |f1/fw| < 1.4$$

$$0.8 < |f2/fw| < 1.1$$

where f_1 and f_2 are focal lengths of said first lens unit and said second lens unit, respectively,
and f_w is a focal length of said zoom lens in a wide-angle end.

61. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

- (a) $35 < v_{11n} < 65$, and
- (b) when $35 < v_{11n} \leq 52$ [≤ 52]],
 $-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $52 < v_{11n} \leq 60$ [≤ 60]],
 $1.5 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $60 < v_{11n} < 65$,
 $1.5 < N_{11n} < -0.022 v_{11n} + 2.94$,

where v_{11n} is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N_{11n} is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said second lens unit and said fourth lens unit move in unison with each other during variation of magnification, and

wherein the separation between adjacent lens units varies during zooming.

62. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

(a) $35 < v11n < 65$, and

(b) when $35 < v11n \leq 52$ [≤ 52],

$$-0.013 v11n + 2.19 < N11n < -0.005 v11n + 1.92,$$

when $52 < v11n \leq 60$ [≤ 60],

$$1.5 < N11n < -0.005 v11n + 1.92,$$

when $60 < v11n < 65$,

$$1.5 < N11n < -0.022 v11n + 2.94,$$

where $v11n$ is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and $N11n$ is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said fourth lens unit comprises a negative lens and a positive lens, and has at least one aspheric surface, and

wherein the separation between adjacent lens units varies during zooming.

63. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive

refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

- (a) $35 < v_{11n} < 65$, and
- (b) when $35 < v_{11n} \leq 52$ [≤ 52]],
 $-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $52 < v_{11n} \leq 60$ [≤ 60]],
 $1.5 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $60 < v_{11n} < 65$,
 $1.5 < N_{11n} < -0.022 v_{11n} + 2.94$,

where v_{11n} is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N_{11n} is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said fourth lens unit has a plastic aspheric lens, and

wherein the separation between adjacent lens units varies during zooming.

64. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

- (a) $35 < v_{11n} < 65$, and

(b) when $35 < v_{11n} \leq 52$ [≤ 52],

$$-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92,$$

when $52 < v_{11n} \leq 60$ [≤ 60],

$$1.5 < N_{11n} < -0.005 v_{11n} + 1.92,$$

when $60 < v_{11n} < 65$,

$$1.5 < N_{11n} < -0.022 v_{11n} + 2.94,$$

where v_{11n} is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N_{11n} is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said second lens unit comprises one positive lens and a positive cemented lens composed of a negative lens and a positive lens, said third lens unit comprises a negative lens and a positive lens, and said fourth lens unit comprises a negative lens and a positive lens, and has a plastic aspheric lens, and

wherein the separation between adjacent lens units varies during zooming.

65. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

(a) $35 < v_{11n} < 65$, and

- (b) when $35 < v_{11n} \leq 52$ [≤ 52],
 $-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $52 < v_{11n} \leq 60$ [≤ 60],
 $1.5 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $60 < v_{11n} < 65$,
 $1.5 < N_{11n} < -0.022 v_{11n} + 2.94$,

where v_{11n} is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N_{11n} is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said first lens unit has two negative lenses at the most object side, and moves during variation of magnification, and

wherein the separation between adjacent lens units varies during zooming.

66. (Currently Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of negative refractive power, a second lens unit of positive refractive power, a third lens unit of negative refractive power, and a fourth lens unit of positive refractive power, wherein said first lens unit has a negative lens located on the most object side thereof, and said negative lens located on the most object side of said first lens unit satisfies the following conditions:

- (a) $35 < v_{11n} < 65$, and
(b) when $35 < v_{11n} \leq 52$ [≤ 52],
 $-0.013 v_{11n} + 2.19 < N_{11n} < -0.005 v_{11n} + 1.92$,
when $52 < v_{11n} \leq 60$ [≤ 60],

$$1.5 < N_{11n} < -0.005 v_{11n} + 1.92,$$

$$\text{when } 60 < v_{11n} < 65,$$

$$1.5 < N_{11n} < -0.022 v_{11n} + 2.94,$$

where v_{11n} is an Abbe number of a material of said negative lens located on the most object side of said first lens unit, and N_{11n} is a refractive index of the material of said negative lens located on the most object side of said first lens unit,

wherein said first lens unit comprises three lenses including two negative lenses at the most object side, and

wherein the separation between adjacent lens units varies during zooming.

67. (Previously Presented) A zoom lens according to Claim 5, wherein $1.2 < |f_l/f_w| < 1.4$.

68. (Previously Presented) A zoom lens according to Claim 8, wherein $0.9 < f_2/f_w < 1.0$.

69. (Currently Amended) A zoom lens according to Claim 1, wherein the following conditions are satisfied:

$$(a) \ 37 < v_{11n} < 65, \text{ and}$$

$$(b) \text{ when } 35 < v_{11n} \leq 52, -0.008 v_{11n} + 2.02 < N_{11n}$$

$$N_{11n} < -0.005 v_{11n} + 1.90$$

$$\text{when } 52 < v_{11n} \leq 60, -0.008 v_{11n} + 2.02 < N_{11n} < -0.005 v_{11n} + 1.92$$

when $60 < \nu_{1n} \underline{\nu_{11n}} < 65$, $-0.008 \nu_{1n} \underline{\nu_{11n}} + 2.02 < N_{1n} \underline{N_{11n}} < -0.022 \nu_{1n} \underline{\nu_{11n}} + 2.94$.

70. (Currently Amended) A zoom lens according to Claim 69, wherein

$$1.15 < \left| \frac{f_1}{f_2} \right| \left| \frac{f_1}{f_w} \right| < 1.45$$

where f_1 is the focal length of said first lens unit and f_2 f_w is the focal length of said ~~second~~ zoom lens unit at the wide-angle end.

71. (Previously Presented) A zoom lens according to Claim 1, wherein the following conditions are satisfied:

$$0.84 < f_2/f_w < 1.1$$

$$1.65 < |f_3/f_w| < 2.8$$

$$2.8 < f_4/f_w < 7.1$$

where f_2 is the focal length of said second lens unit, f_3 is the focal length of said third lens unit, f_4 is the focal length of said fourth lens unit, and f_w is the focal length of said zoom lens in the wide-angle end.